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ABSTRACT

The flexibility of an educational program, institution, or system can be described as the ability of the unit to absorb negative responses, such as reductions in funding or enrollments, and continue to function in a viable manner. One approach to adjustment to such reductions is to effect cuts in personnel, current, and equipment spending. This paper presents a planning model designed to improve planning by providing quick cost analyses of various alternatives proposed within the instructional component of a budget. The model is based on the number of full-time equivalent teachers needed as determined by enrollment projections by year and productivity ratio, and the number of contract teachers employed. It assesses payroll records of an instructional division and determines the pay status (rank and years at the college on the salary schedule), contract status, and year of birth of each instructor. It provides the mechanism for determining production and productivity ratios. Flexibility is provided by the percent of production covered by part-time faculty. An additional part of the model allows for compounding raises for instructors. The use of the model and its flexibility are described. Appendices provide illustrations. (MB)

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INSTRUCTIONAL PLANNING MODEL**

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FLEXIBILITY AND A DEPARTMENTAL INSTRUCTIONAL PLANNING MODEL

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The flexibility of a program, institution or system could be described as the ability of the unit to absorb negative responses and continue in a viable manner. Reductions in funding and student enrollment, as well as shifts in market demand have become more apparent in recent years. The institutions and programs that have been able to absorb these shock waves and maintain their efficiency and effectiveness have in common the needed degree of flexibility. They were able to make the downward adjustments in personnel, current expenditures and equipment cost necessary without destroying the vitality of the program.

One approach to providing for flexibility has been to provide reserve funds to support the program at relatively the same level during the first year or so of adjustment. Actually, this method seems to have been developed more to accomodate new growth than to cushion the effects of negative conditions. The method is effective to some degree for the latter situation. However, in Florida recent legislative action has forced a reduction in reserves or fund balances and reduced effectiveness of this device. Further, fund balances have been eroded by such unanticipated conditions as the energy crisis, larger than anticipated rates of inflation and reduced State level funding (actual cuts in initial funding levels in two years). In any case, the use of fund balances to cover flexibility requirements is at best only a temporary measure. The program must eventually adjust to the new situation. Each reduction of the fund balance to meet flexibility needs for one program reduces the fund balance and the potential for reserves to be used to meet further crisis.

If the colleges are to be able to meet these requirements for flexibility, there must be some reasonable understanding of the amount or degree of flexibility required under various conditions and the sources of that flexibility.

The problem can be viewed in two ways. First: Adjustments can be made on the input side. Reduced governmental funding can be overcome by increased student and other funding. Decreases in the "typical" student population can be overcome by increases in other "non-typical" student enrollments. In the educational enterprise output does not directly influence input as is the case of the industrial model. Therefore, adjustments to output will have little effect on increasing input. Second: Adjustments can be made on the operational side. Cuts can be made in personnel, current and equipment spending. Resources can be reallocated to more viable functions. Efficiency can be increased. Programs can be dropped if they are not of proven worth.

Adjustments to inputs have the disadvantage of slow response and are best used when there is a long lead-in time to make adjustments. When governmental support is reduced it is often too late to increase student fees or find outside funding. Attracting a new and different student population requires time for recruitment and program modification. Input adjustments should be considered and made to improve the long range situation but should not be expected to reduce initial impact to any degree when the need for flexibility is brought about by unexpected circumstances.

Left with the operational adjustment as the immediate source of relief, it would be well to consider some areas which lend themselves to modification. The most obvious areas are the non-people areas of current and equipment expenses. There are probably very few budgets which do not provide funds in these areas which can be cut or the amounts reduced without serious damage to programs. However, if there have been prior problems, the chances are that these accounts have had several visitors and the well may be too nearly dry. A strong effort should be made to discover some maintenance level in these accounts. There would appear to be a need to view the problem from a short range time span and then look at the effect over a longer time period to see if the cumulative effect of the maintenance level will produce compounding problems in the future. How low can we hold equipment maintenance cost and not expect to incur equipment replacement cost? How do depreciation and the compound interest on the saving work in determining the effectiveness of the saving? We also need to examine the effect on the moral and perceived efficiency of the personnel in the programs. If a reduction of the expenses which appears proper to meet the necessity for flexibility causes the program to suffer personnel problems, the results are as real as if caused by the original problems.

A major problem with seeking total relief through the current expense and capital outlay method comes from attacking a big problem at the small end. These two expenditures made up only 22.01 percent of the total educational and general expenses of the Florida Community College System in 1975-76. Another way of looking at this is to say that salaries are using 77.99 percent of each dollar of expenditure. A 10 percent reduction in both personnel and current and equipment cost would produce a savings of \$7.80 in the personnel area and \$2.20 in the current and equipment expenses for each \$100 of total expenditure. You can get about three and one-half times the bang out of the 10 percent percent cut in personnel.

How much more difficult is it to get the 10 percent in personnel? That would depend on the present program status and on planned flexibility. A number of factors need to be considered. What part of the load is covered by part-time and/or overload? What is the personnel turnover from attrition and retirement? How many of the personnel are able to work in other viable programs? What are the staff development funds available for staff re-training? How many staff and support positions can be cut or not filled if vacated? Can productivity be increased? What will be the effect on quality of programs and staff morale with increases in productivity? What are the restrictions of union contracts? The answers to these questions should

provide for a set of alternates which can be used by management and staff in seeking acceptable solutions. No one solution would cover all areas and some programs may have to be reduced or eliminated in any final action. The need to know more about the degree of flexibility needed in a specific setting was highlighted in the development of a Departmental Instructional Planning Model. (Appendix A). Now the model seems to hold some promise of shedding light on a limited answer to the problem.

The Planning Model was developed to assist in a long range planning effort and to examine the request for full-time faculty which are a part of each budget cycle. The model called for a reasonable set of parameters for decision making at the budget making level. It was decided that these parameters should carry over into the planning cycle. Enrollment projections by year and productivity-ratio formed the basis by establishing the number of full-time equivalent (FTE) teachers needed. The number of continuing contract and annual contract teachers were then subtracted to find the number of FTE instructional positions open.

At this point flexibility raised its ugly head. How many of these positions should be filled? It seemed obvious that all open positions should not be filled. Was the problem one of unfilled positions or did it really relate in some way with total positions? It was decided that the problem related to total positions and further, that there was a need for some sort of cushion to take care of enrollment fluctuations. Thus, a defined element of flexibility was born.

The problem shifted from "what is it" to "how much must we have". Here the problem still rests. There appear to be no guidelines to govern the degree of flexibility and little, if any, research in the area. The model was first run on a consensus concept of the degree of flexibility or, we felt, on a pooling of ignorance.

The model itself is designed to assess payroll records of an instructional division and determine the pay status (rank and years at college on salary schedule), contract status (annual or continuing) and year of birth of each instructor. The program then moves these instructors through a five year progression on the current pay schedule. Annual contract teachers are changed to continuing contract after three years at the college. A retirement age is a variable input item and the program removes teachers from the file when the record reaches this age.

The program determines the number of full-time equivalent instructors by dividing production by productivity ratio. The production and productivity ratio are variable input items with one ratio used and current year with five planning years of production required. The maximum percent of production to be covered by full-time personnel is input as the "production factor". If a division has not exceeded this percentage, the model will add annual contract teachers until full-time personnel will cover the maximum load allowed by the production factor.

The level of new hire on the salary scale is a variable input item. Part-time teachers are assumed to teach the load represented by the difference between full-time equivalent instructors and contract instructors. The cost of a part-time equivalent instructor forms the last item of basic input. The output consists of a listing by current year and five outyears of the number and cost of teacher by status. Total FTE positions and total cost are listed by year. Output items consisting of the cost/SSH and average contractual salary are proving useful in analysis. The flexibility listed in this part of the model is the percent of production covered by part-time instructors. The sum of the flexibility and the production factor will always be greater than or equal to one.

A second program in the model allows for compounding raises for both contracted and part-time instructors. These percent raises are input individually by year and by part-time and full-time. Total variable input for both programs can be made on one card.

The four divisions which make up the academic or college transfer section of the college have been used for an initial analysis of the impact of changing the value of variables. The two variables chosen were the production factor and the productivity ratio. The production factor was set at 75% and 65%. The productivity ratio was set at a value found during term I of the 1977-78 academic year. The second value used was a simple 10% increase in the ratio. (Appendix B).

This first attempt at analysis looked at the difference in total cost in the last outyear, the stability of the cost per student semester hour from the first to last outyear, and the change in the cost per SSH over the same years for the current pay schedule. The difference in total cost was examined over the four runs for the fixed raises used in the analysis.

The test changes in productivity ratio produced lower total cost and cost/SSH than did changes in the production factor with both current schedule and with raises. Cost per student semester hour tended to stabilize with any change. The difference in cost per SSH was less for production factor changes.

Although the initial analysis has pointed up several interesting avenues of research, one of the principal outcomes seems to be the flexibility of the flexibility concept. If the individual divisions are studied along with the combination of divisions, it would appear from the initial data that a fixed goal could be reached by different means. One division might choose to reach an allowable total cost by increasing the productivity ratio. A second division could reach its goal by the production factor, a third could reach the goal by making smaller changes in both production factor and productivity ratio.

Planning will be improved by receiving quick cost on various alternates proposed within the instructional component of the plan. The long-range effects of changing any of the input variables can be studied quickly. Hiring practices can be examined with the model on a yearly basis to monitor future impact. One interesting side effect of the first runs showed that a 5% raise for one year could be given on the saving obtained from any of the alternates used in the test.

The Model is just beginning to be used. Hopefully, its use shall improve our knowledge of the flexibility concept. The value for planning and for the study of hiring practices seems assured. As with any new arrival, the developers wait in anticipation for the next surprise the model shall bring.

DEPARTMENTAL INSTRUCTIONAL PLANNING MODEL
DEPARTMENT: TWO

DATE: 05-11-78

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	CURRENT YEAR	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
STUDENT SEMESTER HOURS	20,699	21,921	22,359	22,807	23,263	23,728
CONTINUING CONTRACT FTE	17	16	16	16	18	18
CONTINUING CONTRACT PAYROLL	305,066.66	294,800.00	298,800.00	301,600.00	333,600.00	336,400.00
ANNUAL CONTRACT FTE	0	2	2	3	1	1
ANNUAL CONTRACT PAYROLL	.00	27,600.00	28,400.00	43,000.00	14,200.00	14,600.00
PART TIME FTE	6.0	6.4	6.9	6.4	6.9	7.4
PART TIME PAYROLL	43,740.00	46,656.00	50,361.00	46,656.00	50,301.00	53,946.00
TOTAL FTE	23.0	24.4	24.9	25.4	25.9	26.4
FLEXIBILITY	26.1	26.2	27.7	25.2	26.6	28.0
TOTAL SALARY	\$348,806.66	\$369,056.00	\$377,501.00	\$391,256.00	\$398,101.00	\$404,946.00
COST/SSH	\$16.85	\$16.84	\$16.88	\$17.16	\$17.11	\$17.07
AVERAGE FT SALARY	\$17,945.10	\$17,911.11	\$18,177.78	\$18,136.84	\$18,305.26	\$18,473.68
*** SALARY INCREASE PROJECTION ***						
FULL TIME RAISE		.050	.050	.050	.050	.050
PART TIME RAISE		.000	.000	.040	.000	.000
TOTAL SALARY		\$385,176.00	\$410,787.00	\$445,302.54	\$472,292.36	\$500,442.13
COST/SSH		\$17.57	\$18.37	\$19.52	\$20.30	\$21.09
RETIREMENT		1	0	0	0	0
PRODUCTIVITY RATIO:	899					
PART TIME SALARY:	\$7,290.00					
PRODUCTION FACTOR:	.75					
AC HIRE LEVEL:	2 -AC00-05					
RETIREMENT AGE:	65					

CURRENT SCHEDULE 1982-1983

APPENDIX B

DIVISION	.75 REG P/R Total Salary 1	.75 + 10% P/R Total Salary 2	.65 REG P/R Total Salary 3	.65 + 10% P/R Total Salary 4	P/R 1-2	CHANGE 3-4	FLEXIBILITY CHANGE	
							1-3	2-4
1	598,474	547,971	566,034	517,131	50,503	48,903	32,440	30,840
2	404,946	377,740	387,926	363,920	27,206	24,006	17,020	13,820
3	303,611	280,850	287,391	265,830	22,761	21,561	16,220	15,020
4	105,251	93,567	97,941	93,567	11,684	4,374	7,310	0
TOTAL	1,412,282	1,300,128	1,339,292	1,240,448	112,154	98,844	72,990	59,680
%					7.94%	7.38%	5.16%	4.59%
WITH RAISE								
1	735,913	674,743	688,548	632,491	61,170	56,057	47,365	42,252
2	500,442	465,472	474,413	449,308	34,970	25,105	26,029	16,164
3	374,560	345,968	350,878	326,016	28,592	24,862	23,682	19,952
4	128,769	114,966	119,515	114,966	13,803	4,549	9,254	0
TOTAL	1,739,684	1,601,149	1,633,354	1,522,781	138,535	110,573	106,330	78,368
%					7.96%	6.90%	6.11%	4.50%
CHANGE COST/SSH FROM 1978-79 to 1982-83								
	\$ %	\$ %	\$ %	\$ %	\$ %	\$ %		
1	1.07 4.46	0.96 4.36	0.89 3.90	0.26 1.21				
2	0.23 1.36	0.41 2.64	0.11 0.67	-0.17 -1.10				
3	0.29 1.95	0.21 1.52	0.13 1.34	-0.18 -1.34				
4	1.28 7.26	0.03 0.17	-0.04 -0.23	0.03 0.17				
TOTAL	0.61 3.26	0.51 2.95	0.38 2.12	-0.01 -0.06				
COST / SSH								
	78-9 82-3	78-9 82-3	78-9 82-3	78-9 82-3				
1	23.99 25.06	21.98 22.94	22.81 23.70	21.39 21.65	2.12	2.05	1.36	1.29
2	16.84 17.07	15.51 15.92	16.24 16.35	15.51 15.34	1.15	1.01	0.72	0.58
3	14.87 15.16	13.81 14.02	14.16 14.29	13.45 13.27	1.14	1.02	0.87	0.75
4	17.63 18.91	16.78 16.81	17.63 17.59	16.78 16.81	2.10	0.78	1.32	0.00
TOTAL	18.69 19.30	17.25 17.76	17.92 18.30	16.96 16.95	1.54	1.35	1.00	0.81
%					7.97%	7.37%	5.18%	4.56%